Notebook, N-87-01-01

This notebook covers the period January-August 1888. The first entry is misdated as January 1887. The book was used by Jonas W. Aylsworth to transcribe the results of experiments, nos. 1-830, on wax compounds for phonograph cylinders. The rough records of these experiments can be found in N-88-01-02 and N-88-11-13.3. There are also notes about distillation and crystallization experiments. The front cover is labeled "#564." The inside front cover is inscribed "# 564 J W Aylesworth July 31 89." Another inscription indicates that the book was used as an exhibit in *American Graphophone Co.* v. *National Phonograph Co.*, United States Circuit Court, District of New Jersey. The book contains 181 numbered pages. Several pages were removed before the book was paginated.

(XE-2449)
N-87-01-01

#5-64

Mayer walk.
July 31-87

Mr. Arick
Treat of N.Y.
American Graphophone Co. } No 10
National Phonograph Co. } Infringing
"Defendants" Exhibit Lyman Smith
Note Book No 564. H.D.B. 64th

Notes.

I The following experiments were made between the dates Jan 1st 1887, and the ones given for some of them ~~[illegible]~~ and then. So to locate the date of any one the one meant either forward or backward must be taken and the position it occupies between the two will tell pretty nearly at what time the experiment was made.

II Sample results of a great many of these experiments were saved and especially of the ones whose results are not recorded, with the idea that a sample of material that can be offered to is far better than any discription of the substance would be.

III The following experiments are copied from rough notes made at the time of the experiment; and in regular order as to time.

Experiments on Phonograph Wax.

At this time, Paraffin 100, Carnauba 30, Rose wax
Commencing Jan 1 - 1897.
100 gm of Paraffin as a base.

No. of experiment.		
1	Carnauba	10
	"	12
	"	14
	"	16
	"	18
	"	20
	"	22
	"	24
	"	26
	"	28
	"	30 * Regular.
	"	32
	"	34
	"	36
	"	38
	"	40 great contraction.
2.	Spirits Turpentine	10
	Carnauba	60
	"	40
3.	Linseed oil	10
4	Carnauba	30
	Burgundy pitch	10

No. Paraffine 100

5 Burgundy pitch 10
6 " " 20
7 " " 30
8 " " 40

9 Carnauba 50 Venice Turpentine 10
10 " 50 Glycerine 10

Carnauba 60
11 Stirling solid, boiled, Linseed Oil 15

12 Myrtle Wax 40,
13 " " 50;

14 Shellac. 30,

15 Paraffin wax boiled 4 hours. little hardly, darkened, no good.

16 Gum Thus 50 fair, rather soft,

17. Alpha naphthol 10, 20, 30, 40 (good but the naphthol evaporates, sometime some.

18 Beta " 10, 20, 30, 40 not as good as alpha

19. Naphthalene 100

19½ Anthracene 100

Cerasin 100 gm. as a base.

No		
20	Carnauba	5
21	"	10
22	"	20
23	"	30 "Bang up" can be moulded No scratch, scarcely, Mr Edison adopts it as Regular
24	Carnauba	40 Good cut, but has great contraction more scratchy than Reg.
25	Shellac	30
26	Shellac	40
27	Myrtle Wax	40
28	Yellow Ochre	40
29	Paraffine	100
30	White Bees Wax	100
31	Japan Wax	100
32	Stearic Acid	100 Rather hard, fairly good.

33.	Crude Japan Wax	100	
34	" Bee Wax	100	
35	S Permanti	100	
36	Alpha Naphthol	20	
37	" "	30	
38	" "	40	good but not as hard as #17 less crackl.
39	Beta "	35	
40	" "	50	
41	Naphthalene	30	
42	"	40	
43	"	50	
44	Anthracene	40	
45	"	50	
46	Dextrine	20	
47	"	30	doesn't mix.
48	Reg Wax #-3 -	100	
	Lamp Black	50	
49	Reg Wax	100	
	Oxide Zinc	50	

No		
	Cocain	100
50	Spermaceti	10
51	"	20
52	"	30
53	"	40
54	Cannabis Spermaceti	30 13
55	Cannabis Spermaceti	30 26
56	Cannabis Spermaceti	30 39
57	Cannabis Stearic Acid	30 26
58	Radix	20
59	"	30
60	"	40
61	"	50
62	"	75
63	"	100
64	Cannabis Guttapercha in chloroform	30 10.

No		
	Cerasin	100
65	Gum Mastic	20
66	" "	40
67	Resin	20
68	"	40
69	Gum Anime	20
70	" "	40
71	Gum Olibanum	20
72	" "	40.
73	Dracoris Gum	20
74	" "	40
75	Borax Butter	20
76	Gum Elim	20
77	" "	40
78	" Guaic	20
79	" "	40
80	Asfoetidum	20
81	"	30
82	"	40
83	"	50

80	Cerasin 100
84	Gum Chidda 20
85	" " 40
86	" Galbanum 20
87	" " 40
88	" Euphorbium 20
89	" " 40
90	Cerasin is boiled down, somewhat harder than usual colored considerable.
91	Gum Sandarach 15
92	" " 30
93	" Kowri 10
94	" " 20
95	" " 30
96	Gum Dammar 20
97	" " 40
98	" Ammoniacum 30

No	Crossin 100	
99	Carbonate	Soda no Definite Prop.
100	"	Lead
101	"	Zinc
102	"	Magnesia.
103	"	Strontium
104	"	Barium.
105	"	Tin.
106	Oxide	lead
107	"	Tin.
108	"	mercury.
109	"	Zinc.
110	"	Iron.
111	"	Alumina.
112	"	Antimony
113	"	Cassium

No.	Cerasin 100		
114	Chloride	soda.	No deposit %
115	"	Zinc.	"
116	"	lead	"
117	"	ammonia	"
118	"	Tin	"
119	"	Antimony	"
120	"	Iron	"
121	acid	phosphoric	"
122	"	Wolframic	"
123	"	hydrochloric	"
124	"	Tannic	"
125	"	Boracic	"
126	"	Chromic	"
127	"	Succinic	"
128	"	Oxalic	"

No	Corrosion 100.	
129.	Syrian Asphalt	50
130	" "	60
131	" "	70
132	Soft Mexican Asphalt	100
133	Hard " "	100
134	" " "	50
135	Bituffed Trinidad	50
136	" "	60
137	Bitumen	60
138	"	50
139	Sulphur	10
140	"	20
141	"	30

No.	White Wax 100 Base.		
145.	Carnauba	10	
147	"	15	
148	"	20	
149	"	25	
150	"	30	good very small scratch somewhat electrical and buggy.
151	"	31	
152	"	32	
153	Shellac	10	
154	"	20	
155	"	30	
156	Myrtle Wax	10	
157	" "	20	
158	" "	30	
159	" "	40	
160	Sumac Thus	20	
161	" "	30	
162	" "	40	
163	Paraffine	100	
164	Japan Wax	100	
165	Crude " "	100	

No	White Wax 100 Base	
166	Stearmetti	20
167	"	30
168	"	40
169	"	50
170	Stearic acid	10
171	" "	20
172	" "	30
173	" "	40
174	Palmitic acid	30
175	Tannic "	30
176	" "	40
177	Lanolin "	30
178	" "	50
179	Glue	30 Does not mix,
180	Crude ozokerite	50
181	" "	100
182	Caramel	30
183	Licorice	20
184	"	30

No	White Wax 100 or Base, (27)
185	Cocoa Butter 20
186	" " 40
187	" " 50
188	Reg Wax #23 - 50 Vaseline 10
189	Reg Wax #23 — 50 Rosin Pitch 10
190	Reg #23 — 50 Rosin Pitch - 20
191	Reg #23 — 50 Soft Tar - 10
192	Reg #23 — 50 Soft Pitch - 20
193	Reg #23 - 30 Kaolin white - 20
194	Reg #23 - 30 Kaolin (white) - 30

No.	White Wax 100 as Base
195	Reg # 23 — 50 solid Chloride Zinc 10
196	Reg # 23 — 50 Phosphoric anhydride 10
196	Reg Wax # 23 — 50 solid K.H.O. — 10
197	Reg # 23 — 50 anthracene — 10
198	Reg # 23 — 50 Naphthalene — 10
199	Chloride — 5
200	" — 10
201	" — 15
202	" — 20
203	" — 30
204	Reg # 23 — 10 Chloride — 5

No.	White Wax 100 as Base.
205.	Reg #23 — 20 Chuck — 5
206	Reg #23 — 30 Chuck — 5
207	Reg #23 — 30 Chuck — 10
208	Gum Mastix 10
209	" " 20
210	" " 30
211	" Sandarach 10
212	" " 20
213	" Galabanum 10
214	" " 20
215	" Kewrie 10
216	" " 20
217	" " 30

No.	W. Lute Wax 100 as a base		
218	Gangra Dragonine		10
219	"	"	20
220	"	"	30
221	Gum O libanum		10
222	"	"	20
223	"	"	30
224	" G ophrobium		10
225	"	"	20
226	"	"	30
227	" G Elemi		10
228	"	"	30
229	"	"	40
230	" Anime		20
231	"	"	30
232	"	"	40
233	" G mastic		20
234	"	"	40

Many of these gums chief not sure

No	White Wax as a base
235	Resin — 20
236	" — 30
237	" — 40
238	Reg #23 — 10 Spermacetic — 10
239	Reg #23 — 20 Spermacetic — 20
240	Reg #23 — 30 Spermacetic — 30
241	Reg #23 — 10
242	" #23 — 20
243	" #23 — 30
244	" #23 — 40
245	" #23 — 50
246	Damma — 10
247	" — 20
248	" — 30
249	Bay Wax — 10
250	" " — 20
251	" " — 40

No.	White Wax 100 as a Base.	
252	Gum Elemi	10
253	" "	20
254	" "	30
255	Asphaltum	10
256	"	20
257	"	30
258	Soft Mexican Asphalt	10
259	" " "	20
260	Syrian Asphalt	10
261	" "	20
262	Pure Trinidad	10
263	" "	20
264	Bitumen	10
265	"	20
266	Chalk	10
267	"	20
268	"	30
269	"	40
270	"	50
271	Gum Ammoniac	10

No.	White Wax as a Base.
272.	Gum ammoniac 20
273	" Aloes 10
274	" " 20
275	" " 30
276	Reg #23 – 30 Balsam Copaiba 10
277	Kaolin 20
278	" 30
279	" 40
280	" 50
281	" 75
282	" 100
283	Reg #23 – 30 good, quite liq. Gutta percha in chloroform 10
284	Reg # 23 – 30 very good. Rubber in benzol 10
285	Gum Gedda 10
286	" " 20
287	" " 30

No.	No White Wax or Ball.
288	Reg #23 — 10 Japan Wax — 20
289	Reg #23 — 20 Japan Wax — 20
290	Reg #23 — 30 Japan Wax — 30
291	Reg #23 — 20 Lamp Black — 10
292	Reg #23 — 20 Zinc White — 10
293	Alpha Naphthol — 10
294	" " — 20 fairly
295	" " — 30 good
296	" " — 40 but there is
297	" " — 50 danger of the naphthol distilling off already.
298	Beta naphthol. 10

No.	White Wax as a Base.
299	Beta Naphthol 20
300	" " 30 not as good
301	" " 40 Pages 293-297
302	" " 50
303	Caustic soda 10. acts on it and makes a hard material with bright luster of cut, no scratch. soluble to a certain extent in water,
304	
305	

No	Purified Japan Wax or Beeswax		
310.	Camauba	5	
311	"	10	
312	"	20	
313	"	30	Bang up not very shiny
314	"	40	hard great contraction,
315	"	50	
316	Asphalt (Syrian	20	
317	" "	30	
318	" (Soft Mexican)	20	
319	" " "	30	
320	" Pure Trinidad	20	
321	" " "	30	
322	Alpha Naphthol 40 – makes it very much softer and by mixing a certain percent it makes an fluid oil		
323	Caustic Soda. Soforni fied it		
324	Stearic acid	5	very good
325	" "	10	better
326	" "	30	excellent.

No.	Purified Japan Wax as above
327	Shellac 10 fairly
328	" 20 good.
329	" 30
330	

No.	Crude Japan Wax as Base,		
345	Camauba		10
346	"		20
347	"		30 non electric good, but inclined to be sticky
348	"		40 20 that Quit would admit
349	Myrtle Wax		20
350	"	"	30
351	"	"	40
352	Alpha Naphthol		acts same as in # 322
353	Shellac		10
354	"		20
355	Dammar		10
356	"		20
357	"		30
358	Sugar		30
359	Stearic	acid	10
360	"	"	20 good.
361	"		30

No	Cocoa Butter as Base.	
362.	Camphor — 10	
363	" — 20	
364	" — 30	fairly good.
365	" — 40	
366	Rosin — 30	strictly.
367	Stearic Acid — 20	
368	" " — 30	
369	" " — 40	
370	Shellac — 20	
371	" — 30	
372	" — 40	
373	Asphalt Syrian. 10	
374	" " 30	
375	" " 60	

No	Stearic Acid as Base (5)		
381	Camauba	— 20	very hard
382	"	— 30	with great
383	"	— 40	contraction
384	Cerasin	10	
385	"	20	
386	alpha Naphthol	30	
387	" "	20	
388	" "	10	
389	" "	5	
390	Japan Wax crude	5	
391	" " " "	10	
392	" " "	20	
393	Shellac	3	
394	"	5	
395	Gum Ammoniac	5	
396	" "	10	good.
397	Paraffin	10	
398	"	20	fairly good
399	"	30	somewhat scratchy.

No	Stearic Acid as Base
400	Spermaceti 100
401	Crude Bee Wax 100
402	Glycerine 10
403	" 20
404	" 30
405	Anylene Oil 10
406	" " 20
407	" " 30
408	Oil Citronella 10
409	" " 20
410	" " 30
411	" Cubebs 10
412	" " 20
413	" " 30
414	" Anise 10
415	" " 20
416	" " 30
417	" Organum 10

No.	Stearic Acid Base	
418	O'l Organanum	20
419	" "	30
420	" Croton	10
421	" "	20
422	" "	30
423	" Cassia	10
424	" "	20
425	" "	30
426	" Juniper Wood	10
427	" " "	20
428	" " "	30
429	" " Berries	10
430	" " "	20
431	" " "	30
432	" Succini	10
433	" "	20
434	" "	30
435	" Origanum	10
436	" "	20
437	" "	30

No	Stearic Acid as a Base		
438	Oil Tansy		10
439	"	"	20
440	"	"	30
441	"	Fuel	10
442	"	"	20
443	"	"	30
444	"	Tar	10
445	"	"	20
446	"	"	30
447	"	Amber	10
448	"	"	20
449	"	"	30
450	"	Linseed	10
451	"	"	20
452	"	"	30
453	"	Naphtha	10
454	"	"	20
455	"	"	30
456	"	Amber	10
457	"	"	20
458	"	"	30

No	Strain Acid as a Base		
459	Oil	Orange	10
460	"	"	20
461	"	"	30
462	"	Spruce	10
463	"	"	20
464	"	"	30
465	"	Thyme	10
466	"	"	20
467	"	"	30
468	"	Sweet Corn	10
469	"	"	" 20
470	"	"	" 30
471	"	Olive	10
472	"	"	20
473	"	"	30
474	"	Cade	10
475	"	"	20
476	"	"	30
477	"	Castor	10
478	"	"	20
479	"	"	30

Mo of tannic Acid as a Base.

480	Oil	Cocoa Nut	10
481	"	" "	20
482	"	" "	30
483	"	Pea Nut	10
484	"	" "	20
485	"	" "	30
486	"	Cotton Seed	10
487	"	" "	20
488	"	" "	30
490	Oleic	Acid	10
491	"	"	20
492	"	"	30
494	Balsam	Tolu	10
495	"	"	20
496	"	"	30
497	"	Fir	10
498	"	"	20
499	"	"	30
500	"	Canada	10
501	"	"	20
502	"	"	30

No	Stearic Acid or Bar.	
503	Balsam Copaiba	10
504	" "	20
505	" "	30
506	Oil Wormwood	10
507	" "	20
508	" "	30
509	" Lard	10
510	" "	20
511	" "	30
512	" Petroleum	10
513	" "	20
514	" "	30

No. Carnauba as a Base.

520	Black Ozokerite	10
521	" "	20
522	" "	30
523	Syrian Asphalt	10
524	" "	20
525	" "	30
526	Wood tar Pitch	10
527	" " "	20
528	" " "	30
529	Glycerine	10
530	"	20
531	"	30
532	Oleic acid	10
533	" "	20
534	" "	30
535	~~Olei~~ Vaseline	10
536	"	20
537	"	30
538	Glacial Phosphoric acid	10
539	" "	20
540	" "	30

good

No.	Cannauber Wax as a Base	
541	Burgundy Pitch	10
542	" "	20
543	" "	20
	Linseed Oil	10
544	Chloride Zinc	10
545	Stick Caustic Soda	10
546	Coal Tar Pitch	10
547	" " "	20
548	" " "	30
549	Phosphoric Anhydride	10
550	" "	20
551	Sulphur	5
552	"	10
553	"	20

These were cooled down when cooled about very high temperature the cannauber blend becomes solid at point but when heat was carried very high burned black and gave off sulphur dioxide fumes.

No	Camauba Wax as a Base			
554	Balsam	Copaiba	10	
555	"	"	20	
556	"	"	30	good.
557	"	"	40	
558	"	Canada	10	
559	"	"	20	
560	"	"	30	
561	"	Peru	10	
562	"	"	20	
563	"	"	30	
564	"	Tolu	10	
565	"	"	20	
566	"	"	30	
567	"	Tar	10	
568	"	"	20	
569	"	"	30	
570	"	"	40	
571	Oil	Cocoa Nut	10	
572	"	" "	20	
573	"	" "	30	
574	"	Pea Nut	10	
575	"	" "	20	
576	"	" "	30	
577	"	Cotton Seed	10	
578	"	" "	20	
579	"	" "	30	

No.	Carnauba as a Box.	
580	Oil Olive	10
581	" "	20
582	" "	30
583	" Cade	10
584	" "	20
585	" "	30
586	" Castor	10
587	" "	20
588	" "	30
589	" Sweet Corii	10
590	" " "	20
591	" " "	30
592	" Thyme	10
593	" "	20
594	" "	30
595	" Orange	10
596	" "	20
597	" "	30
598	" Spruce	10
599	" "	20
600	" "	30
601	" Amber	10
602	" "	20
603	" "	30
604	" Linseed	10
605	" "	20
606	" "	30

No.	Carnauba Wax as a Base	
607	Oil Cinnamon	10
608	" "	20
609	" "	30
610	" Mace	10
611	" "	20
612	" "	30
613	" Dill	10
614	" "	20
615	" "	30
616	" Fancy	10
617	" "	20
618	" "	30
619	" Fan	10
620	" "	20
621	" "	30
622	" Citronella	10
623	" "	20
624	" "	30
625	" "	40
626	" Cubebs	10
627	" "	20
628	" "	30
629	" Anise	10
630	" "	20
631	" "	30

No.	Camamba as a Bose.	
632	Oil Organanum	10
633	" "	20
634	" "	30
635	" Croton	10
636	" "	20
637	" "	30
638	" Juniper Wood	10
639	" " "	20
640	" " "	30
641	" " Berries	10
642	" " "	20
643	" " "	30
644	" Sassafras	10
645	" "	20
646	" "	30
647	" Sweetwood	10
648	" "	20
649	" "	30
650	" Origanum	10
651	" "	20
652	" "	30
653	" Cassia	10
654	" "	20

No. Cumandra Wax is a Bee.

655 Oil Cassia 30.

656 Calodion – did not mix.

657 Metalic sodium ½.

658 " " 2

659 " " 3 very good.

660 cocain 2 0 nonelectric

metalic sodium 3 very good.

661 Oil Petroleum 20

662 " " 30

663 " Worm wood 20

664 " " " 30

664½

664½ " Laid 30.

No. Miscellaneous Mixtures,

665. Gum Thus 100
alpha Naphthol 30

666 Gum Thus 100
alpha naphthol 20

667 Gum Tolu 100
" alpha Naphthol 10

668 Gum Thus 100
alpha Naphthol 5

669 Rosin 100
alpha Naphthol 30

670 Rosin 100
alpha Naphthol 20

671 Rosin 100
alpha naphthol 10

672 Rosin 100
alpha Naphthol 5

673 Linseed Oil 100
alpha Naphthol 30

No. Miscellaneous Mixtures

674 Oil Cassia 100
alpha Naphthol 30

675 Glycerine 100
alpha Naphthol 20

676 Glycerine 100
alpha Naphthol 10

677 Glycerine 100
alpha naphthol 5

678 Paraffine 100
Cannauba 100
Ceresin 100
Bees Wax 100
White Bees Wax 100
Prime Japanese 100
Crude " Wax 100
Spermaceti 100
Stearic Acid 100
Myrtle Wax 100

Very good only it is a little too soft and will gum up under under.

No. Miscellaneous Mixtures

679. Syrian asphalt 100
Sodium (metallic) ½

680 Syrian asphalt 100
Sodium (metallic) 2.

681 Camphor to which has been added a small fragment of metallic sodium
100
Syrian asphalt 100
Cerasin residue by ether (#697) 120
Result was "bang up", non electric.

No

Miscellaneous Experiments,

686. Carnauba is partly saponified by alcoholic potash the product is boiled in water to dissolve out the saponified portion; the residue is mixed with ceresin, result is good but not sufficient to warrant its use instead of ordinary carnauba in Reg #23 on account of the expense of the operation.

687. Carnauba is melted under vacuum and solidified; bubbles of air come out of it but its crystalline properties were unaltered.

688 I wet preparing surface of a reg #23 cylinder with alcohol it seemed to entirely take away the electric properties and did not scratch,

No

On crystallization (to permit)

689. Tryed cooling melted Reg # 1 while in intense vibration, produced by means of an electric tuning fork, large size, also tryed stearic acid, spermacetic alpho-naphthol and reg. # 23 the result was not very promising, it only seemed to make the crystals formed, a little finer size

690 Tryed revolving melted carnauba in a bottle fastened to the end of a string, untill it became solidified, apparently no change in crystalization.

691. Tryed cooling paraffine (melted) over the pole of a powerful magnet. Made a very peculiar effect the paraffin when cold had a large lump made directly over the magnet pole

On ~~Cryst~~ C ystallization.
The paraffin was melted in small tin pan, and the lump was as represented in Fig 1.

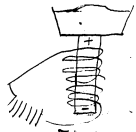

Fig. 1.

192 I tried cooling a pan of melted paraffin over two poles (+ & −) of a powerfull magnet, then was a depression formed over one pole and an elevation over the other though indistinct, From above experiment would conclude that particles of paraffin during crystalization or solidification, are repelled by one pole + attracted by the other pole of a magnet.
To be followed up when have more time.

No. In Crystallization.

693. Fused mixture of paraffin and alpha naphthol which crystallized well, cooled from a melted state over poles of a powerfull magnet. The crystals were influenced considerably by the magnetism; from two or three germs over the poles of the magnet they radiated out in different directions and the lines formed curved in various ways.

694 Fused cooling Fig. 23 in vessell surround by a helix as shown in Fig 2 with the idea of making the crystals lay parallel with the circumference so that the needle would cut in the direction of their length instead of across them at right angles Fig 3 shows the kind of crystalisation wanted. Fig 4 the natural crystallization

Fig 2.

Fig 3.

Fig 4.

Aro On Crystallization.

This was not thoroughly followed up.

695. Tryd extracting camauba with alcohol to dissolve out the crystalline portion. A part was seperated but result was not satisfactory

696 Tryd extracting camauba with ether. result differed some what from 695 but they were not what was wanted.

697. Tryed extracting ceresin by ether. result was "being it". The residue not dissolved consisted of about half of the total amount of ceresin, and was hard translucent, with fine luster on cut surface, when cooled on glass it made a very shining surface when the was lay in contact with the ~~wax~~ glass. made a good photographic wax would also be splended for electric ~~coating~~.

No. Miscellaneous Experiments.

698. Paraffin treated as in #697, made a harder paraffin but had more smell than #697.

699. White wax treated as in #697, ~~made~~ candle obtained was very good only the expense of white wax is ~~not~~ too great to make it of use.

700. Potatoes were sliced and ~~dried~~ and extracted by ether to obtain potato wax. Went round in Watts Chem Dictionary but did not obtain the wax only obtained a sugary dark substance; followed the directions given in Watts exactly.

701 Distilled Carnauba. obtained no solid substance suitable for wax cylinders but some were solid and might be tried if the more liquid ~~portion~~ portions were separated it would be good. Lee.

No. Distillation.

702 Distilled bees wax and sand distillate taken at different times. acrolein was given off.

703 Distilled Japan wax. obtained no suitable wax material but obtained a colorless liquid strong enough to knock a horse down, was probably quite pure acrolein. distillate was saved.

704 Distilled Myrtle Wax. obtained no hard substance suitable for wax cylinders, but obtained a fluid similar to one mentioned in 703 which was even ~~stronger than that~~ one. distillate was saved.

705 Distilled paraffin
706 " cream.
707 " Spermaceta.

March 20th 1888. (95)

No. Linseed Asphalt.

708. Linseed Oil boiled down in a pan or vessel partly covered, is ultimately converted into a black tough non sticky somewhat elastic asphalt, which mixes with many of the waxes dissolves in turpentine, benzole chloroform and other solvents.
When mixed with waxes it has the tendency to toughen them, but when too much is added they become draggy.
This material would make an excellent elastic varnish for carriages &c.
In making care must be taken not to cook it to long or it will oxydize and make quite a different substance samples should be taken from time to time. It is better to apply strong heat and boil down quickly.
About ⅔ of the oil is converted into the asphalt.

No.

709 Glycerine boiled down at rather high temperature leaves an asphalt block, tough, non sticky but disintegrated by water.
This material mixes with some of the waxes but so far has proved of no value for use in phono grafik wax

710 Cotton seed oil boils down under similar conditions to those in making linseed asphalt to an asphaltic material very like the latter.

No.

711 Sand oil can be boiled down to an asphalt similar to that of linseed oil.

Nos 715. On Cotunite, (Mature Chloride of Lead) described in Watts as a horn like substance, with a view to its use as a phonograph recording medium, an insulator and other uses provided it has the qualities expected.

Fused in crucible Lead chloride 4 gm
Copper " 1 "
Sodium " 1 "
Copper Sulphate 1 "
The result was a hard crystalline, brownish mass.

716 " " " Lead Chloride 3 gm.
Sodium " 3 "
Copper Sulphate ½ "
" chloride ½ "
The result was a hefar colored mass, very hard and crystalline.

717 " " " Lead 10 gm.
Copper 2 "
Sulphur 2 "
Sodium chloride 5 "
Result was a hard crystalline metal and a white, crystalline, hard substance

.011 No. On Horn Lead.

718. Fused in crucible. Lead sulphate 4 gram,
Sodium chloride 6 "
copper sulphate 3 "

Result — *

719 " " " Lead sulphate 4 gram
Sodium chloride 6 "
copper " sulphate 1 "
sulphur ½ "

720 " " " Lead chloride 5 "
Sodium " 4 "

721 " " " Lead 10 gram.
copper sulphate 5 "
Lead chloride 3 "
Sodium " 4 "

* See first page. II.

721 Na

722. Fused in crucible. Lead 10 gm.
" Chloride 4 "
Sodium " 4 "
Copper Sulphide 2 "

723 " " " Lead 4 gm.
Copper 2 "
Sulphur 2 "
Sodium Chloride 5 "

724 " " " Lead Chloride 5 gm
Sodium 2 "
Copper 2 "
Sulphur 3 "

725 " " " Lead, copper sulphate and sodium, with chlorine passed through while in molten state.

No.

726. Fused in crucible Lead 3 gm.
Copper 2 "
Sulphur 2 "
Sodium Chlorid. 5 gm.

727 " " " Lead chloride 6 gm.
Copper " 4 "
Copper sulphate 2 "
Chloride sodium 2 "

728. " " " Lead chloride 6 gm.
copper chloride 2 "
lead sulphate 3 "
sodium chloride 3 "

No. On brown Lead.

729. Fused in crucible. Lead chloride 8 gram.
Sodium " 5 "
Copper sulphate 3 "
cooled slowly.

730. " " " Lead chloride 6 gram.
Copper " 1 "
Sodium " 2 "
Lead sulphate 2 "
cooled slowly.

731 " " " Lead chloride 6 gram.
Sodium " 2 "
Lead sulphate 2 "
Copper 1 "
Poured in cold water.

732 " " " Lead sulphate 6 gram.
Sodium " 4 "
Copper chloride 2 "

733 " " " Lead chloride 6 gram.
Copper " 6
Sodium " 4
Copper sulphate 2 "

On horn lead.

734 In crucible chloride lead 3gm.
" tin 1 "
" sulphur 1 "

735 In combustion tube with air exhausted, freshly made chloride lead is fused. This, when cooling is left in the tube with air still exhausted until it be cool solid enough to be safe from any detriment. Result was a very horn like substance in appearance, but it was brittle and harder than horn and consequently not adapted for the use anticipated for it.

737. A solution of Syrian asphalt 100
Cornauba 100 ceresin is dissolved
in benzol to a thick paint and
this coated on a sheet of paper
The idea being to make something
that will not liquify turning off
to be used once and thrown
away; made an excellent
film with good cut and so on,
did not try on phonograph.

738

May 27. 1888

Mo

Metallic Salts of Fatty Acids

739. Oleic Acid is saponified by $\frac{1}{6}$ of its weight of Lewis' Lye and the resulting soap dissolved in hot water and precipitated by excess of a solution of acetate of lead, the precipitate washed dried and fused.

Result was a very amorphous, fluorescent translucent, brownish, waxy mass which very much resembled crude Japan wax. When mixed with carnauba in the proportion of 100 of the oleate to 30 carnauba it formed a very good phono wax non electric, and with very little scratch, very heavy shaving very encouraging as it gives an opening to a new and promising field.

10 Metallic Soaps.

740. Oleic acid saponified by ½ its weight of ~~stearic acid~~ and precipitated by acetate of lead in excess. Made a harder oleate than #739.

741 Oleic acid saponified by ½ its weight of Morris' lye and precipitated as in #739 gives a harder and heavier oleate than #740. From this it would seem that it could be made of any consistency by altering the amount of soda which is true up to a certain limit when the melting point becomes so high that it reduces before fusing.

No Metallic Oleates.

742. Oleate Magnesia made similar #739 and precipitated by excess of sulphate of magnesia. Made thin forced "light plastic mass. Mixes with water though with quite difficulty than #739.

743. Casein 50 gm.
Cumarba 30 "
Oleate lead 50 "
"Bang up"!

744. Casein 50 gm.
Cumarba 30 "
Oleate Magnesia 50 "
good, run less scratch than #743.

744½ Copper, lead, Oleate.
Precipitated from soap solution by mixture of acetate of copper & lead.

No. Metallic Oleates.

745. Duplicated # 739 making 6 lb. Of this lot gave Payne 3 lb to experiment with for the making cylinder, and other experiments.
Was an exact duplicate of No 739.

746. Soap of oleic acid is precipitated by a mixture of acetate of lead and sulphate of magnesia. with the idea of making an alloy oleate. Result was similar to the lead oleate but lighter colored and more transparent.

No. Oleates (Metallic) saved for future reference

747. Oleate Copper precipitated from soda oleate by acetate of copper,
Result was a green waxy, shiny mass, harder than lead oleate, less coherent " " " ,
very electrical.
It mixes with carnauba and makes a hard wax, with great lustre on cut surfaces. elegant for the phonograph except that it is very electrical.

748. Copper acetate mixed with glycerine and heated to high temperature, precipitates metallic copper in a finely divided state.

749. Oleate chromium precipitated from the soda soap as a violet precipitate, from a solution of chloride of chromium.

Oleates,

750 Zinc precipitated from boiling solution of oleate of sodium, by sulphate of zinc.

751 Mercury oleate precipitated from oleate of soda by chloride mercury,

752 Tin Oleate precipitated from soda oleate by chloride Tin,

753 Alumina Oleate. precipitated from solution of oleate soda by chloride of alumina.
Soft, transparent, elastic, lustrous,

754 Oleate Barium precipitated from oleate soda by chloride barium.

No. Oleates.

755. Oleate Calcium precipitated from oleate soda by chloride calcium.

756. Oleate Strontium, precipitated from oleate soda by chloride strontia.

757. Oleate Manganese, precipitated from oleate soda by sulphate manganese.

758. Oleate of Cobalt precipitated from oleate soda by nitrate cobalt.

759. Oleate Silver & Lead. Oleate of lead solution mixed with nitrate silver solution forms a white precipitate from oleate soda solution.

No. Oleates.

740 Residue of olein acid which probably contains stearic & palmitic is heated in evaporating dish and a concentrated solution of acetate lead added. The lead combined precipitating fm acetic acid. This is important as lead and other oleates and fatty acid salts might be made much cheaper in this way ~~than in the~~ ordinary.

741. Oleate antimony precipitated from soda soap solution by butter of antimony.

742 Oleate silver precipitated from soda soap by nitrate of silver not stable.

744 Oleate Iron precipitated from soda soap by nitrate of Iron.

Mo Oleates.

765 Oleate Nickel. precipitated from soda soap by nickel sulphate or acetate.

766 Oleate Uranium, precipitated from soda soap by uranic acetate.

767 Oleate Bismuth precipitated from soda soap by acetate. bismuth.

768. Magnesium residual oleate, Crude oleic acid is cooled to low degree and strained the residue saponified by caustic soda solution 130 gms (of 1 of gr 1.2648) to 200 grams of oil. this is dissolved and precipitated by 165 gms mag. magnesium sulphate dissolved in water, washed and placed in steam oven to dry.

768. Palmitate.

When dry it melts down slowly which yet in the steam comes to a transparent, liquible, harder than lead oleate, insoluble in water compound having great lustre. This might be good for a varnish, for photog copies plates and for making cylinders

769. Palmitate of lead made same as the oleate except Mules palmitic acid is used in stead of oleic acid hard and very good.

770. Palmitate copper. hard but electrical made same as oleate copper.

771 Palmitate magnesium. made same as oleate. hard transparent.

772. Palmitate manganese. hard, reddish or pinkish hue, very good on phonograph

No. Palmitates.

773. Palmitate iron. made same as the oleate, brown hard

774. Palmitate alumina made same as the oleate. hard with a kind of a gelatine consistency. high melting point.

775. Palmitate zinc made same as the oleate.

776. Palmitate of Manganese softened with a little Cresin or lead oleate makes apparently just the dulce, for piano wax.

777. Palmitate lead softened with cresin is very good in appearance and wt.

778 Japan wax saponified and precipitated by acetate lead. no good. the Japan wax did not completely saponify and made muddy solution.

Miscellaneous Metallic soaps.

779. Molasses 100 Boiled for some time dissolved.
calcined soda 28
Oleic acid 100 in water and precipitated by acetate lead.
Very tough dark brown to black, waxy mass.

780. Red Oil 100
Caustic soda 25
Dissolved and precipitated by half + half magnesium sulphate + lead acetate.

781. Palm oil 100 } Precipitated by
Oleic acid 100 } magnesium sulphate.
Soda soap of

782. Palm oil oleic acid + linseed oil saponified and precipitated by sulphate magnesium.

Miscellaneous Metallic soaps,

783. Saponified Oleic, and with soda by lime's lye and precipitated by acetate lead,

Resinate all are insoluble without decomposition

784. Resinate lead. Made in same way as the oleate.

785. Resinate copper same way as the oleate.

786 Resinate iron same way as oleate iron. (Brownish insoluble without decomposition.

787. Resinate Magnesia made same as oleate mg.

788. Resinate alumina made same as the oleate.

789 Resinate manganese, made same as the oleate

No. Miscellaneous Metallic salts.

790. Resinate mercury, made like the oleate.

791. Resinate Zinc made same as the oleate.

792. Resinate Tin made same as the oleate,

793. Resinate Bismuth made same as the oleate.

794. Stearate of lead made same as the oleate very hard in fact too hard for using to oil would make a good hardner.

795. Stearate alumina made same as the oleate.

No.	
796.	Stearate Manganese, very hard, higher melting than lead stearate.
797.	Stearate Copper hard, green
798.	" Iron " reddish brown
799.	Stearolate Lead made from the soap of equal parts stearic and oleic acids precipitated by lead acetate fusion Several pounds were made also some cylinders absolutely perfect;
800	Magnesium Stearolate made in like manner to the lead soap of 799, infusible.

July 25. 1888.

Moved up to Room 4 with Payne and the following experiments were made jointly with him.

No.	Metallic fatty acid salts. July 25/88.
301	Oleic Acid (crude) filtered 6 lbs or 2732 gms Lime Lye (standard solution of sp. gr. 1270 = 1300 cc Saponified hot and dissolved soap in hot water, precipitated by 9450 cc Standard solution of acetate lead. Washed in water, spread on evaporating pan & dried in hot air. After washing it formed a sticky cream colored mass but when dry it changed to a light yellow.
302.	July 25/88. Stearic Acid 2732 gms. Standard lye solution 1300 cc. Saponified by aid of heat to a fine white soft soap; dissolved in hot water - straining twice through cloth & precipitated by 9000 cc Standard solution acetate lead, to a fine white granular mass, not cohesive; washed in H_2O & dried in oven.

Standard Solution Ley.

Lewis Ley, dry, powdered.

Dissolve 1 lb. (equivalent of 6 lb. Oleic or Stearic acid according to old saponification) in sufficient quantity H_2O. Filtered and found sp. gr. at 90°F to be 1,270°. Total amount of solution = 1300 cc which was taken as the quantity required to produce the old degree of saponification of 6 lbs of Oleic or Stearic acid.

Standard Solution Pb acetate

Neutral acetate lead in H_2O

Sp. gr. of 1.150° at 86° F.

No. Metallic fatty acid salts.

803 July 27, '88.

Stearic acid — 455 gm.

Oleic " — 455 "

Alcoholic Potash Lye — 433 cc. (see offset)

Saponified heat to a cream colored soap. Dissolved in hot H_2O to a clear solution, and precipitated by neutral lead solution.

Precipitate white adhesive, granular white mass washed thoroughly in cold water, dried in hot air bath. Obtained minus loss by adhesion to vessels = 1150 gm when washed down.

804. July 28, 1888.

Lead 100 gm.

Lewis Lye 171 "

Precipitated by $C_4H_6Pb''O_4 + aq$.

Granular, white, sticky mass of consistency of lead plaster. Dried in hot air bath to friable brown adhesive mass.

110 Metallic Soaps.

805 July 26/88.

Crude Oleic Acid — 600 gm.
Stand solution lye = 570 cc,
Precipitated by solution $MgSO_4$,
to granular mass resembling
stearate lead, dried in hot air
bath to straw colored transparent
mass.

806. July 30/88.

Stearic Acid — 600 gm.
Oleic acid (crude) 600 "
Saponified by — 235 cc of
stand. solution lye, & precipitated by
aluminium chloride.

No. Metallic Soaps.

207. July 30th 1888.

Peanut Oil — 600 gm.
Stand solution lye — 285 cc
very hard to saponify.
Precipitate by acetate of lead to a very white cohesive mass resembling Cheese of lead in consistency. but the heat required to drive out the moisture, reduced lead and turned the mass black.

208. July 30th 88.

Stearic Acid — 300 gm.
Oleic " — 300 "
Stand solution lye — 285 cc
Precipitated by cupric acetate.

No. Metalic soaps.

~~July~~ Aug 1/38.

809. For hardening # 903.

Stearic acid — 100 = 500 gms.

Oleic " — 75 = 375 "

Saponified by stand solution lye 416 cc

Doubled all amounts.

Aug 3/38.

810 Stearic acid — 100 = 366 gms.

Palmitic " — 66 2/3 = 200 "

Stand solution lye - 235 cc.

Saponified readily to a clear soap solution, when dissolved in H_2O.

Precipitated by acetate lead, gave very white dry granular precipitate

Melts at 210° F.

When melted came down to a darkish clear liquid, O.S. cylinder very hard, dry, semi transparent but scored to scratch about same as gelatine on phonograph disk

"Bang Up!" 14 and - powder dirt, indentations not deep, fine talk. "Nothing better wanted."

First lot did not turn out like
testtube sample but was rather soft
sticky and dark; with very poor
surface, though good fracture
After being cast in mold and allowed
to stand some time became
mottled & absolutely no good.
Unlike other compounds it expands
on cooling.

No. Metallic Soaps.

911 Aug 5th/88.

Pure Elaidiate of lead.
Pure Elaidic Acid — 100 = 300 cc
Saponified by standard solution
lye. 142.5 cc
Saponified readily to a yellow
liquid which on cooling became
quite hard. Dissolved very readily
in warm H_2O
Precipitated by warm $C_4H_4PbO_4$
to a finely divided yellowish mass
which on drying became a
yellowish white powder.
When melted it became semi-trans-
parent yellowish mass, very hard
& having good cut and surface.

Aug 8th 1888

912 Elaidiate of lead.
Elaidic Acid — 453 gm.
Stand. Sol of lye — 216 "
Saponified to a thin soft muddy brown
soap, very soluble in hot H_2O.

Cylinder made of #314 was Melt, had firm surface hard & polished for about a sixteenth of an inch deep but deeper it was yellow, giving no polish and having no adhesion.

No Metallic soaps.
Precipitated by $C_4H_6PbO_4$

313 Stearo Oleate of Lead.
Stearic acid — 100 = 300 gms.
Oleic " — 46.6 = 200 "
Standard Sol Lye = 235 cc.

314 Stearo Palmitate of Lead.
Stearic acid — 100 = 300 gm.
Palm o'l (crude) 46.6 = 200 "
Standard Sol lye — 235 cc.
Saponified readily to a soft yellow mass easily soluble in hot water.
Precipitated by Pb acetate to a finely divided yellowish mass which on being dried and melted became hard though not very strong.

No. Metallic Soaps.

Aug 9th 1888

815 Stearo Palmitate of Lead.

Stearic acid — 300 gm.

Palm oil (clarified) 200 "

Standard Lye — 235 cc.

Saponified readily to a soft yellowish soap — easily soluble in hot water.

Precipitated by $C_4H_6(PbO)_4$ to finely divided yellowish mass, when dried and rolled became hard on surface and rather more very similar to 814.

Aug 14/88.

816 Stearic acid — 200 gm.

Olive " " treated with PbO_2 & H_2O (sm offsate) 133.3 gm.

Saponified by Stand Lye = 152 2/3 cc. to a transparent soap easily sol. in hot water. Precipitated by lead acetate, precipitate white granular rather adhesive.

Crude Palm Oil treated in flask to 464°F for ½ hour then filtered. Color changed from bright yellow to dark brown color, resembling color of oleic acid. The process was carried on too long or heat raised to high - otherwise the color would have been destroyed rather than changed

No. Metallic Soap.

817. Stearic acid - 100
Palm Oil (see opposite) 46.4 gm
Saponified by Stan Sol lye, 128 cc
to a hard white soap - soluble in hot water but not easily.

Aug 18/88.

818. Stearic acid - 200 gm
Palm Oil - decolorized by boiling, to a light lemon color 133.3
Stan Sol Lye 152 ⅔ cc
Formed a soap slightly tinged with yellow
Precipitated by $C_4H_6PbO_4$ to a white soap, when melted down very much resembled #10 in appearance but was rather when melted down & cooled;

Cocoa nut Oil saponified by strong lye dissolves in H_2O + the fatty acid precipitates by addition of HCl, washed and water evaporated.

Resulting oil resembled, under palmitic acid in taste, smell + under cold but pour. Slightly lighter than under in color.

No. Milade Soaps.

819. Stearic acid — 25 gms.
Cocoa nut oil 1 eq. of oxide 14.6
32 eq.
Stan Sol Lye.
Saponified by aid of heat to a light t, hard soap dissolved in hot water to a white solution.
Precipitated by acetate lead to a fine ~~light~~ granular mass
Melted down to a semi trans parent light brown mass exhibiting to properties of #810 only hard + more ~~smooth~~, powdery to cut.

No. Metallic Soaps.

820 Stearic Acid — 100 gm.
Cocoa Nut Oil = 66.6 "
Standard Solution Lye 128 cc

Soap - white, hard while hot, transparent. The oil was hot but saponification did not take place fully until some of the water had been evaporated — then it turned hard quickly; soap dissolved to a perfectly clear solution.
Precipitated by acetate lead to a white granular mass, which melted down to a semi transparent clear light brown mass closely resembling #810 only harder therefore more powdery to the cut

No. 921 Metallic soaps.
Aug 20th 1883.

Stearic acid	—	200 gm.
Cocoanut Oil	—	200 "
Stand Solution Lye	—	188 cc.

Soap white hard - saponification same as #320, Dissolved to a clear solution - Precipitated by ~~Sulph~~ Acetate had to white granular mass, Melted down to a clear & very trans fount liquid but when cold it has not very good cut.

No. Metallic Soaps.

822 Stearic Acid — 100 gm
Cocoa nut Oil — 100 "
Stand Solution Lye — 154 cc
Did not all saponify at once but by heating until some of the H_2O had evaporated it became a hard soap very white, gave a perfectly clear solution in hot H_2O. Precipitated by acetate lead, to finely divided white mass.

823 Stearic Acid — 200 gm.
Cocoa nut Oil — 133.3 "
Oleic Acid — 50 "
Stand solution — 200 cc.

Cocoa nut Oil - Saponified completely while hot with strong lye (Sp. G. 1.300 then precipitated by HCl, washed & water evaporated. The resulting acid closely resembles Merks palmitic acid in odor, taste, color & density

No Metallic Soaps Aug. 21st/88.

324. Stearic Acid 100 grm
Cocoa nut Oil (treated - suffrite) 66.6 "
Stand Solution Lye - 78.3 cc

Saponified readily - hot to a pearly hard soap. Dissolved to a slightly milky solution in hot H_2O. Precipitated by acetate lead, precipitate granular and not very adhesive. Melted down to a clear mass, when cold became light grayish brown in cut fracture, color, fold. resembled # 310 monthly thus any precious. It is perhaps a trifle more powdery to the cut,

No Metallic Soaps. Aug 21/88

25. Stearic Acid — 100 gms
Cocoa Nut Oil (see 24) 80
Stand Solution Lye = 84.6 CC
Saponified hot with little
more difficulty than
#24

26. Stearic Acid 75 gm.
Cocoa nut oil 25 "
Oleic Acid 75 "
Stand solution Lye 104.75 CC
Saponified when very hot
to ~~form~~ faint amber coloured
soap-gum clear solution
in H_2O, Precipitated by
acetate lead to white adhesive mass
Melted down to a ~~solid~~ light coloured
quite trans faint mass. was very
clear when hot. too soft. much too
soft but other wise good — flexible somewhat

No. Metalic Soaps.

827. Cocoa nut Oil 50 gm.
Oleic acid 25 "
75

Stearic Acid 100 gm.
Cocoa nut Oil + Oleic (as above) 66.6 gm.
Stand solution dye = 78.2 cc
Saponified when very hot to a transparent amber colored soap. Rather cloudy solution in H_2O. Precipitated by acetate lead to a white very finely divided mass.

No. Metallic Soaps. 8/22/88.

828. Cocoa Nut Oil Sample (#1) treated as in (#824) — — — 100 gm.
Stand. Solution Lye 48. cc.
Saponified readily to white and when hot amber colored soap. Precipitated by acetate lead to slightly adhesive granular white mass. When melted was more forest, perhaps slightly more than (#310) which it resembles, but was too hard and powdery.

#829 (#2) Cocoa oil - saponified & fatty acids precipitated by H.Cl.)
of Stan acid. 200 gm.
Stan Sol Lye. 100 cc
Saponified to a rather soft translucent amber colored soap

Oil sample #12
Fatty acids obtained by saponification & precipitation of a mixture of #2 Cocoan. Oil 100
Oleic acid 15–

No. Metallic Soaps. (179)

Clear solution in H_2O precipd. by acetate lead to very white somewhat adhesive granular mass,

130. Fatty acids (see opposite) – 200 gm
Stron. Sol lye – 100 cc

Saponified readily to white semi transparent soap. Clear solution in hot water. Precipd. by acetate lead to white granular hard mass of peculiar behavior grains about size of #6 shot – hard and not adhesive, melted down, when transparent, when cold semi transparent, printing could be read through piece ½" in thickness,

Bleaching experiments,

Oil Samples.

#1, O.S.

Sample of $C_{16}H_{32}O_2$ obtained from Sohn & Link @ 40 fr lb. from it was made #10 which Mr Edison found so good at one time

In reality it is not palmitic acid but a mixture of palmitic, oleic and small amounts of capric, caproic, and other volatile acids.

2, O.S.

$C_{18}H_{34}O_2$ ($PbO_4 + H_2O_2$) not heated but allowed to stand for several hours to settle. Found oil on top which when filtered was in color and general appearance between $C_{18}H_{34}O_2$ & $C_{16}H_{32}O_2$.

When cooled down to 60°F & allowed to ~~cool~~ stand for 6 hrs a dirty white precipitate settled out leaving the oil clear slightly brown color slightly resembling $C_{16}H_{32}O_2$

#3. O.S.

$C_{18}H_{34}O_2$ = 100 by wt,
PbO_4 — 50 " "
H_2O_2 — 50 " "

heated $C_{18}H_{34}O_2$ to 212°F then added PbO_4 after H_2O_2 and left to stand after well stirring, stood 18 hrs, then decanted and filtered.

#4, O.S.

Palm Oil - heated to 104°F then treated with mixture of $H_2Cr_2O_4$, HCl + H_2SO_4, or bleaching mixture recommended by Watt, allowed to settle, decanted, water evaporated & filtered hot.

#5 O.S.

Palm oil heated at same time with Hypo chloride lime & Hydrochloric acid the resulting oil is again treated in same manner.

#6 O.S.

Same as #5 only process not carried so far as section #5 before retreatment.

#7. O.S.

Palm oil treated with Hypo chloride of lime that is boiled together, oil separated, decanted washed H_2O evaporated, and filtered.

8, O.S.

Cocoanut oil - saponified with standard lye at 95°F only about ⅓ of the oil formed a soap, this part decomposed in H_2O & fatty portion separated by HCl washed & filtered.

9, O.S.

The fatty #8. not saponified

To be continued in book, 564.